Permeable Reactive Barriers Research: Ground Water and Ecosystems Restoration Division

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This presentation will provide an overview of research efforts at EPA on the application, monitoring, and performance of permeable reactive barriers (PRBs) for ground water restoration. Over the past 10 years, research projects conducted by research staff at EPA's Office of Research and Development have focused on field and laboratory evaluations of the geochemical, hydrogeological, and microbiological factors that govern the performance and functioning of PRBs. Understanding these factors is necessary in order to predict the longevity of PRB systems, conduct economic analyses, and optimize implementation of this ground water cleanup technology for a wide variety of hazardous compounds. The approach taken in studies to date has focused on developing and testing site characterization tools for monitoring and evaluating contaminant-removal mechanisms and hydraulic performance of PRBs, in addition to lab- and field-based studies to document the important physical, chemical, and biological processes in PRB systems. An ultimate goal of the work is to develop a conceptual framework and modeling approach for evaluating PRB performance based on site ground water geochemistry and hydrology. The research has been carried out, in part, to provide EPA Regional Offices and Program Offices with data collection tools and technical proficiency for assessing PRB applications and provide regulators and the regulated community with a scientific and economic framework for selecting ground water cleanup technologies that is based upon site-specific variables.

Recently, a synthesis of research findings has been prepared and presented in an EPA report titled "Capstone Report on the Application, Monitoring, and Performance of Permeable Reactive Barriers for Ground-Water Remediation" (EPA/600/R-03/045 a,b). Key findings from this report will be presented, in addition to summaries of other projects on treatment of ground water contaminants using iron- and carbon-based reactive materials.